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EAST EUROPE REPORT

SCIENTIFIC AFFAIRS

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CONTENTS

BUDAPEST WORLD FAIR PRIZE WINNERS DESCRIBED

Budapest NEPSZABADSAG in Hungarian 24 May 83 p 10

[Article by Emil Szluka: "The Grand Prize Winners of the Budapest World Fair"]

[Text] As is well known, the technical novelities of this year's Budapest World Fair were realized among much more difficult conditions of enterprisal development than at any time until now. In spite of this, their number did not decrease: altogether almost 50 companies' new products were rewarded and from among them 11 won the grand prize of the fair. But the selection of the grand prize-winning products was not easy, because our large-scale industrial concerns presented themselves with so many kinds of new products, which suit the most important directions of development and at the same time are also popular instruments, machines, equipment and structural materials on the international markets.

Telecommunications Engineering in Impetus

The EP-512-marked model subexchange of the Beloiannisz Telecommunications Factory excels even among the grand prize winners, which is a result of technical and product development perfected over many years. This, however in general is characteristic of the products of the Hungarian professional telecommunications industry, in whose series are technological information systems, aerial conductors and cable, telegraphic and PCM-systems, distance data processing equipment, appliances suitable for the storage of telephone and telex directory numbers and for automatic dialing as well as many precision engineering products.

What does the grand prize winner of the Beloiannisz Telecommunications Factory do? The EP-512 telephone subexchange is an electronic program-controlled telecommunications apparatus, built up from the most modern integrated and semiconductor elements. It fits in a very small place. It is suitable for the arrangement of telephone service in institutions, workshops, hospitals and hotels with the connection of 200 to 6,000 extentions.

Obviously it is an appliance marked mainly for export, but there is also a great need for it in the home markets, mostly because of its special services which it is capable of significantly increasing, namely accelerating the exchange of information. Among these, we emphasize the redirection of telephone calls

from busy to free lines, the transmission of conference talks, the party-seeking joining unit and the possibility of automatic long-distance calls. It stored program control also makes possible the continuous extension and modernization of services. On the market of the Comecon countries, the Beloiannisz Telecommunications Factory preceded every other firm with this apparatus. The value of the equipment exported last year reached 200,000 dollars, or 800,000 rubles. At home, it was first used in the Hungarian Ship and Crane Factory.

The Telephone Factory is superior in the further improvement of the conventional transmission technique systems and won a grand prize with its BR-300/N-design carrier transmission technique system. This is a 300-channel, 4-wire, single-cable apparatus, operating in a separate frequency-running mode; a new product, it in full praises the work of the research engineers of the factory. They extensively took into account the demands of the users--first of all the demands of the home and foreign post office administrations. The multifold service is characterized by the apparatus demanding a small space, its reliability and economic efficiency of its self-consumption. The system works on the trunk-line cables already previously laid down and operating. Thus the investor is relieved from the very expensive cable-laying and installation work. In addition it also has the possibility for extensive enlarging of the telephone channel: in the meantime the apparatus cooperates with the given telephone network without the reprogramming of the telephone system. So its postal use is possibly the most economical. There are already three of these apparatuses operating over here--on the telephone network of the Hungarian National Railway, the Post Office and the National Oil and Gas Industry Trust--also a few abroad and additional ones will be put in running order in the immediate future.

Microprocessor Technological System

It is almost natural that already for many years a Medicor product also appears among the grand prize winners of the Budapest World Fair. This year the company's MMT microprocessor technological system won a grand prize. Now this exceptionally is not medical system technology, though it is also indispensable for medical machines and appliances. This is the novelty in it and gives it exceptional significance.

The MMT belongs to the group of so-called intelligent mechanisms, which means that it contains methods of computer technology and electronic building units, helping their application--mostly independent of the purpose and area of use. From this it follows that the Medicor, only associating with others, could have developed this kind of technological system. For this purpose the company associated with the scientific collective of the faculty of the instrument and measurement techniques of the Technical University of Budapest. Its purpose was to create such special electronic equipment which can become useful everywhere in the development of new products in their instrumental control repairs, not only for itself but also for other factories and institutions.

What does the MMT system consist of? It consists of that kind of building unit, which is connected by standardized circuital charts. In addition it consists of that system which essentially contains those programs that are necessary

for the synchronized operation of the building units (software). Subsequently, during the development of a certain apparatus, the designer needs that kind of instrument with the help of which he can control the operation of the above-mentioned systems. This is also part of the system. Then the whole thing is a "generating appliance," as well as the collection of those particulars which are necessary for designing work. We could call it also an instrument, automatizing the solution of numerous routine tasks of the designing-developing work. The chart system of the Hunter program, which is necessary for control, also belongs to the system.

The MMT is not a completed electronic-technical system but a technical service, continuously reaching further development, which can adjust to the wants of the most various development programs. The National Technical Development Council as well as the Ministry of Industry support its production and development.

What does the Carborobot do?

The common product of the Komarom County State Building Industry Enterprise and the Golden Grain Agricultural Producer Cooperative, the automatic coal-fired, hot-water boiler named Carborobot, received a grand prize for the modern technical solution of coal heating. The product of the association of the two contractors makes a many-sided application possible. The trade name represents a product family from the standard series of which it is possible to choose according to whether they wish to put it into operation for the hearing and hot water supply of family houses, workshops, agricultural buildings, schools or stores, etc. The Carborobot is automatized. The coal bin joining to the furnace supplies the boiler for days without supervision. In addition, the automatizing is also useful for high-efficiency burning. Therefore, there is no more bother with the coal-fired Carborobot than with the automatically operating oil-burning boilers. After more days of shutdown it can be restarted without kindling.

The Carborobot--which was started according to the shifts in the agricultural and building industry--is also suitable for substitution of current, cumbersome heat blowers. The new type of boiler is a novelty also in international comparision, since it reaches the technical parameters of oil heating and its automatic operation makes possible a more economical solution for the heating of the population and community.

Biafol: For Packing

The grand prize-winning Biafol foil is the product of the Tisza Chemical Combine. There is only so much about its importance: the scarcity of its domestic production substantially hindered or rather raised the price, to a large degree, of the appropriate packing of the products of the confectionary and food industry, and we can say the same about the baking and tobacco industries.

The Biafol is a polypropylene foil, stretched in two directions. At the Tisza Chemical Combine, the start of the production--this began in 1982--was a stop-gap, and at the same time, an import-substituting initiative. But the Biafol, in addition, is also an export product and thus defrays the reduced import,

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which is still necessary for its production. In the first year of production the Tisza Chemical Combine exported 50 tons of it instantly, since the quality of its new product--its transparency, mechanical and gas-trapping features--is excellent. The production technology initiated at the Tisza Chemical Combine also makes possible its coloring, its use in the printing industry and the weldability of the foil. It is also available for joining with other foils, lamination and production of foil combinations.

Two additional new products of our chemical industry also won the grand prize: the Caola Cosmetic and Household Chemical Enterprise with its product named Alfozid; yet Hungaria Plastic Works Enterprise with its pvc-delivery pipe and mould product family. Caola also made an import-substituting product, the so-called intermediary; namely, it used such type of material serving for reprocessing, with the help of which many other products--soap, washing paste, anticorrosive--are producable. Steel tube, galvanized with zinc, is replaceable with the utilization of the new product family of Hungaria: the installation labor demand in construction decreases 30-50 percent. The tubes are 20 per-center cheaper than the ones used up until now, and 35 percent less energy is needed for their production. Last year we saved 2 million dollars with these plastic tubes, which also helped the family-house builders on a large scale.

A New Processing Center of Csepel

The Machine-tool Factory of Csepel Works, thanks to its consistent development work, made a good name for itself on the international market of heavy machinery. Its new processing center, honored by a grand prize, also helps the problems of acquiring heavy machine tools for the home machine industry.

Until now, the processing of very heavy and boxy pieces of work, requiring milling and drilling had to be performed by using more steps on various kinds of machines. With the new processing center, all this can be executed on one machine. The machine, with its cutting tool inventory, automatically shapes and processes any kind of spatial surface.

Today the most recently developed products of the home-back-ground industry are already together for the creation of new construction; with their use, the proportion of the indispensable components originating abroad has significantly decreased. With this, new export possibilities have opened up for our unique mechanical engineering. The Machine-tool Factory of Csepel Works has already made 15 of the new machines, has completed its export to Italy and West Germany and for the future has remained in the international forefront with its new product.

Three additional grand prizes demonstrate the achievements of the home industry. The prototype of the new push-tow boat series of the Hungarian Ship and Crane Factory received one; the deep-well pump equalizing beam of the Metallurgy Factory Building Enterprise earned the second one, the third one was awarded to the Chemical Industry Building and Installation Enterprise for the pipeline setting termed a four-way tap. In Hungary this has been produced for the first time; earlier we imported it and now it is under patenting. It is also appli-cable for the automatic reversal of liquid flow not only for oil pipes but

for other pipes of large diameter. With the deep-well pump equalizing beam, the goal is ambitious: namely, this new apparatus used in oil exploitation as developed first of all for overseas export. Indicating in addition that at the creation of new products, it is not the original scope of the manufacturer that is so authoritative, but much rather its capacity for renewal and that for which it is able and willing to undertake with its capacity and the initiative of its engineers.

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PROGRESS IN ELECTRONICS PROGRAM NOTED

Budapest FIGYELO in Hungarian 2 Jun 83 pp 1, 3

[Article by Zoltan Koteles: "The Electronics Industry: It Will Catch Up"]

[Text] The electronics industry has developed very dynamically throughout the world in the last 25 years. Despite the economic recession the rate of growth has exceeded 10-12 percent per year, and according to the forecasts this rate will be maintained for some time.*

The explosive development of microelectronics has fundamentally changed the structure of the electronics industry of developed countries. It has realized the largest-scale mass manufacture in the history of technology, making possible a significant reduction of prices in the past 30 years.

The development of microelectronics has also changed the structure of the user branches. In addition to the use of catalog circuits there has been an increase in the significance of the use of task-oriented circuits. With the latter, one can develop unique solutions which are technically and economically optimal in their applications.

World Production: 360 Billion Dollars

Convergence is one of the most important factors in the development of the electronics industry around the world. With the same technological procedures being used in various areas the structure and circuitry of devices, the selection of parts, production of signals, transmission, storage and operation are being integrated and hardware and software systems are becoming intertwined.

Without the use of electronics no branch of the economy could carry out its tasks at a competitive level today.

The production and consumption of electronic devices have taken on gigantic proportions throughout the world. In 1980 the electronics industry of the world produced products worth 360 billion dollars.

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*On the basis of a lecture given at a session of the Department of Technical Sciences of the Hungarian Academy of Sciences.

The picture of the structure of use which has developed is also thought-provoking. Signal technology devices probably make up one-quarter of all electronics device consumption and some 20-21 percent of their costs are turned to computer technology devices.

Unfortunately Hungary has not been able to keep up with world development in the electronics industry, although it has significant traditions and even today this branch of industry is a considerable part of Hungarian industry. In 1982 there were 135,000 people working in the profession and the branch produced 25 percent of the machine industry production.

But when the explosive development of microelectronics began, world domestic apparatus manufacture recoiled--due to the undeveloped nature of the parts industry.

Eliminating backwardness became a vital question for industry as a whole, because without an industry producing modern parts it was not possible to maintain an industry manufacturing electronic equipment, and the electronics device needs of the economy could not be satisfied. In these circumstances, after preparatory work of several years, the Council of Ministers adopted in December 1981 a central development program for electronic parts and sub-assemblies.

The goal was clear: the electronics industry must provide the device back-ground needed for the electronicization of the national economy, together with services. This was a basically export-offensive strategy for the electronics industry, because the electronicization of the national economy at a high level is possible only if some of the needs are satisfied from domestic sources and another part within the framework of the international division of labor. To do this, the electronics industry must export a good part of its products--as it has thus far, but at a higher level. World trade is merciless, and he who cannot master the technological culture as a seller must be content with lower-level products as a buyer too.

Taking into consideration the needs of the national economy and the export possibilities, we calculate that the production of the electronics industry will increase by 8-9 percent per year over the next 10 years.

Microelectronic and Other Parts

This electronics parts development program, important from the viewpoint of industrial policy, involves two large groups of tasks--the development of microelectronic and other electronic parts and the development of RC elements, ferrites and electromechanical parts equal to microelectronics in size and reliability. The microelectronics program, of determining significance and representing a new technical culture, proposes the following goals for the chief technological phases of parts production:

--The capacity of the design and master mask manufacturing system "feeding" the chip technology manufacturing lines should be 3,000 masks per year. This

will create conditions for the manufacture of 300-400 new circuit types or 1,500-3,000 new equipment-oriented circuit types. The priority requirement being made of the designing system is that it make possible the economical design of equipment-oriented and subassembly-oriented circuits.

The economy requirements are strict ones. Even a few hundred manufactured parts must bear the costs of design. This is absolutely essential because in this way it will be possible to satisfy the equipment-oriented parts needs of the manufacturing branches best suited for the characteristics of Hungarian industry and to improve the competitiveness of the user branches.

--The chip technology base must ensure the processing of 120,000 silicon chips per year. We will create this capacity by purchasing and adapting Soviet know-how and, to a large extent, Soviet machines. In the first stage the adopted technologies will be suitable for manufacture of nMOS and CMOS circuits.

Assembly, encapsulation and testing capacity must be adapted to the foregoing. The chief task is to ensure the throughput of a very large number of types. Obviously measurement technology must be placed on entirely new foundations so that the final phase of parts manufacture should not make unachievable the posted goal of economy.

By virtue of these developments an integrated tool inventory, the necessary intellectual background and an initial assortment of products are to be developed by 1985 within the framework of the Microelectronics Enterprise (MEV).

The transformation of the product structure of the user enterprises, that is, the manufacturers of mechanical equipment, and their preparation to use the circuits mentioned must be ensured by paying extraordinary attention to direct technical cooperation with the parts industry.

One and a half years after the government resolution it can be established that thus far we have progressed according to the program; indeed, we have realized more than we planned in design and mask manufacture. But we are lagging behind with other electronic parts. In the interest of catching up we have ordered our tasks by importance and urgency and on the basis of this we are concentrating research, development and investment activity on the areas most important from the viewpoint of domestic use.

Eliminating backwardness has begun with the realization of the program. The question is whether the electronic equipment manufacturing industry will be able to exploit the new possibilities offered by the parts industry and how and in what direction it will develop.

Quality Communications!

Naturally there will be significant differences in the growth of the several manufacturing branches. The manufacture of professional communications devices and the production of computer technology, automation devices and

medical instruments are developing at a pace substantially faster than the average. It is a new aspect of development that the modernization of electronic technologies, constantly accelerating thus far, is slowing down in the 1980s; what will determine development now is not the modernization of technology but rather user needs. And it appears that so far the users are not capable of exploiting all the possibilities which current devices offer; so the development of applications techniques is coming into the foreground in the place of the development of technology. So the main attention must be concentrated on the links between electronic systems and their environments.

Communications has special significance in the electronics industry, not only because this branch accounts for a quarter of the production of the profession but rather because the social and economic significance of communications is extraordinarily large. The fast, precise, faithful transmission of information has become part of the life of mankind, one of the most important tools for its development. Communications is a "material" part of economic and social life and the need manifested for it is increasing more swiftly than the growth in national income.

The sum spent on the development of Hungarian communications reached three-thousandths of the national total product in 1974-1978. As a result of the unsatisfactory development, the quality of communications services decreased, and the unsatisfied fraction of the needs of the economy and of society for communications increased. But in the world, within a few years, with the appearance of the highly integrated devices of microelectronics, a qualitative transformation had begun in communications and in the techniques of mass communication.

Up to the end of the 1970s the domestic industry which manufactured communications devices was capable of satisfying domestic demand for basic products, while exporting about 70 percent of its production. But at the end of the 1970s, unfortunately, unfavorable changes took place; the design level of the equipment did not follow international development and manufacturing technology, and we had no way to develop at the desired pace. But the most serious problem was that the electronics parts base gradually lagged behind the requirements.

In this situation it became necessary to prepare a medium-range research and development program for the coordinated, systematic execution of the most important research and development tasks which would define the future. As a result of this program, a modern commodity base is available even during the Sixth 5-Year Plan and marketing goals for the Seventh 5-Year Plan have been laid out.

In order to realize the research and development program it will be necessary to concentrate domestic research and development resources and increase their efficiency substantially, but it will also be necessary to purchase licenses in telephone connection technology, landline transmission technology and microwave technology.

The significance of a quality development of postal-industrial contacts has increased extraordinarily. The close link between planning and operation is providing information which—if it is used—will bring manufacturer and user interests closer together and improve market conditions for industry. The creation of domestic networks is also an indispensable condition for increasing export—because they will provide a reference.

Research and development in the area of telephone exchanges are directed at developing modern electronic digital connection systems. The manufacture of an electronic main exchange family, on the basis of license purchase, and of subexchanges, on the basis of domestic development, will begin in 1985.

The goal in the area of landline and wireless transmission technology is the delivery of complete zonal and linear network transmission systems and the networks which can be built from them. In addition to a further development of existing analog transmission systems, we will begin manufacture of digital (PCM) landline and microwave systems.

In the area of microwave communications we are counting on the further spread of digital techniques, an expansion of the frequency bands (to 20-30 GHz) raising the transmission capacity (2,700 and 3,600 channels) and an increase in transmission speed.

The chief developmental goal for ultra-shortwave radiotelephone systems for telephone or data transmission links is the creation of devices needed to create stable, reliable complex networks, in the longer run with the introduction of a digital modulation (PCM) system and use of higher frequencies.

In the area of data transmission equipment the task is development of fourth-generation systems and of intelligent terminals suitable for more complex tasks and the manufacture of subscriber equipment for viewdata and teletext systems. We are reckoning also with the introduction of space communication and artificial satellite broadcasting.

We must also reckon with the spread of electronics in the area of telephone sets. In accordance with the goals in system and equipment development we must also modernize the selection of communications cables.

We calculate that in the next 10 years the manufacture of communications devices will increase at such a pace that by the end of the decade its ratio within the electronics industry will increase to 35-36 percent. Export will increase together with production and in 1990 we will be exporting 75-80 percent of all telecommunications device production.

With the realization of the developmental goals the domestic telecommunications industry will catch up to the international level setting the standard, will be capable of satisfying a significant part of the domestic needs and will remain an export-oriented branch, expanding its sales in socialist and capitalist markets alike.

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VAMOS OUTLINES POSSIBILITIES FOR DOMESTIC COMPUTER ENGINEERING

Budapest FIGYELO in Hungarian 2 Jun 83 p 3

[Article by I. W.: "What Can We Expect in Computer Technology?"]

[Text] "Does computer technology science and research have a future in
Hungary?" asked Academician Tibor Vamos in a talk given at a recent confer-
ence on the applications of computer technology.* They do, but only if we
permit our ideas in this regard to face realities and our conditions, cor-
rectly choosing those developmental fields, which cannot be regarded as
unchanging in themselves. We cannot count on comprehensive and pioneering
developmental achievements in computer technology research in Hungary, and
he who proposes such goals is more of an adventurer than a brave man. The
broad conditions system, the material and intellectual base needed for such
research and development, does not exist in our homeland. But we have noth-
ing to be ashamed of, because at present only Japan and the United States,
in all the world, are capable of undertaking such tasks. But it is also true
that a great number of countries have found computer technology directions
"cut to order."

Back to Realities

What is our computer technology development capable of? Construction based
on our conditions means that by relying on general purpose devices we should
develop unique, special equipment. For example, following adoption of the
IDMS data base management system and building thereon, we succeeded in devel-
oping methods for the construction of unique information systems which are
competitive even abroad.

In the area of computer production our intellectual base and the socialist
element base to be expected will make it possible for us very shortly to
manufacture single-card computers which could be the basic central units for
our computer systems in the future. This is necessary, because a real need
for this is appearing in various areas of applications.

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*On the basis of talk given on 18 May 1983 at a conference entitled "The
Status of Computer Technology Applications in Hungary."

But the memory background is the key area in the development of hardware. Our backwardness in computer technology appears most of all in this area.

Experience shows that even in everyday areas of applications there is a need for a memory background with a capacity of several tens of megabytes, but the larger systems need several hundreds of megabytes. In our homeland the MOM [Hungarian Optical Works] and the BRG [Budapest Radio Technology Factory] are developing magnetic stores; we must support these efforts because the problems appearing in this area are significantly hurting the efficiency of applications.

A crucial backwardness can also be experienced in the construction of network connection systems. Systems built on local networks offer new possibilities for a number of applications. Cheap switching elements which pay off in practice could present an interesting task for the domestic semiconductor industry making special purpose circuits. It will be forced to do so too because foreign acquisition of them is becoming difficult these days and is running into restrictions. It is also necessary to solve the manufacture of large-capacity fiber optics cables, perhaps through socialist cooperation.

Building on reliably operating networks which can be connected even internationally, we can integrate production, distribution and administrative systems in a cooperative, distributed organization. We are preparing a number of elements for the development of such systems in both software and hardware.

In connection with the development of information systems the speaker noted that it is not enough to have one or two original solutions performing different useful tasks; rather we must strive to have general tools capable of aiding individual user needs relatively quickly and economically, at an internationally competitive price, well-documented and supported and in a manner which can be linked to other systems.

Expert Systems

Earlier we nourished great hopes for relational data bases which we regarded as the real solution from the mathematical and logical viewpoint. In recent years, however, it turned out that these systems have a large computer need and their operation is uneconomical under present conditions. The way out must be sought in the development of architectures which also require the development of new types of software. We must achieve design methods which develop software and hardware in parallel in connection with each task, that is, which create conditions for the more harmonious construction of large systems. In connection with this, however, we must give up the hope of solving complex tasks with fully automated mechanisms and gigantic computers.

For this reason there is an effort around the world to develop expert systems which can harmonize machine knowledge and human capabilities. The expert systems are suitable to cause a rethinking of system philosophy and will force us to self-examination and correction. It is worth it to develop these systems for this reason too.

The emphasis of Hungarian computer technology efforts is in applications techniques. We must achieve special results in this area in a very professional manner, relying on general approaches. It is still difficult for us to show developmental achievements in applications which would be accepted on international markets. Earlier, many said that the Hungarian talent was a special one; we did not have suitable hardware but we could be first in the world in software and system construction. It turned out, however, that we could not appear on the market with independent software products of great significance. There are profound reasons for this. Our applications systems are not reproducible, they are not well-documented, they are pieced together on an ad hoc basis and their applicability is weak. We cannot solve these problems by incantation. There is a need for severe self-criticism and harder intellectual discipline; there is also a need for a real computer background for software development. If we can really solve these problems and if we can manufacture unique products with reliable quality, then we will have something to offer the world market, at least in Europe.

The quality requirements have become higher on the computer technology markets of the socialist countries also. If we want to buy new, more reliable semi-conductors then we must also be able to offer hard goods in our applications selection.

Computer technology research and development must go beyond the state of ad hoc fabrication protected by our tariff borders, for it produces uneconomical products difficult to reproduce. The units dealing with computer technology must adjust to the modern developmental requirements, must cooperate much more closely than heretofore and must abandon those monopoly aspirations which made possible a closed production divorced from economic indicators. In each project we must achieve the critical scale which has been adopted throughout the world and which is a condition for competitiveness.

Expert Training

The development of computer technology and increasing social receptiveness depend in large measure on what results we can achieve in this area in education. Today, Hungary belongs in that rare circle of countries which do not yet have independent high-level computer technology instruction which would provide many-sided training of experts. This has serious consequences; for example, mathematicians trained in our universities must learn new things in practice and must be turned toward new life goals. We need experts for whom the computer is not only bread but a passion. Nor does technical training provide a broad foundation in every speciality for the leading industrial creators of future decades. And yet, we need experts who can see the social dimension of contacts between man and machine.

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INFORMATION SCIENCE, MINICOMPUTER APPLICATION ASSESSED

Information Science Development, Prospects

Warsaw ZYCIE GOSPODARCZE in Polish No 21, 22 May 83 pp 12, 13

[Article by Tadeusz Walczak: "We Need Information Science"]

[Text] Ardent debates about information science have been going on in our country for years--about its role, position, trends in application, development rates and prospects. This is not surprising. In many other countries as well, including those with the highest level of development of informational application, one finds different, often conflicting, opinions.

Besides criticism, besides reservations and warnings against excessive dependency of man on computers, world information science is the fastest evolving area of technology and is much less affected by the crisis than other branches of the economy. What is its position in our country?

Roads and Rough Terrain

The best period of development of information science in Poland occurred in the first half of the 1970's, or, more exactly, until 1977. Between 1971 and 1977, Polish industry produced more than 500 computers and some 2,000 minicomputers. But, since 1977, this production declined steeply from 105 units in 1976 to 51 in 1979 to 15 in 1982. Since 1976, production of minicomputers likewise started to wane from 489 in the peak year of 1975, rolling down to 120 in 1981.

With the development of domestic production and imports, we have attained major advances in the building of economic facilities and organizational base of information science. Some relevant data are given in the table.

After a time of exaggerated promises that the computer would bring a key to solving almost all problems and difficulties in economic management and government, there was a swing to an across-the-board criticism accusing information science and computers of being responsible for a large share of failures and errors of management in the 1970's.

Major Indicators of Information Science Development
(as of the end of the year)

Item							
Number of computerized information centers	1300	1380	1656	1805	1896	1886	1852
Employment by centers, thousands of employees	41.3	47.1	51.0	56.2	56.9	57.1	52.0
Number of larage and medium sized computers	514	623	708	756	812	857	874
Number of minicomputers	430	924	1182	1336	1470	1776	1759
Average operation time per workday, hours:							
--large and medium computers	10.6	12.8	13.2	13.1	13.3	13.1	13.1
--minicomputers	5.3	6.0	6.0	6.5	6.4	6.3	6.5
Idle time (as a percentage of nominal time) for large and medium computers, including:	–	–	–	17.3	17.2	17.9	21.9
--for technical reasons	–	–	–	8.9	9.1	8.7	8.2
--for organizational reasons	–	–	–	8.4	8.1	9.1	13.6

Neither the myths about the unlimited capacity of information science nor
its later accusations of causing all the evil produced an efficient program
for applications that would take into account the real needs and capacity
of our economy. Although over the years various attempts have been made to
organize the entire management system with the aid of information science
and computers, the regrettably numerous changes in management, organization
and development coordination did not result from an aware effort to find
the proper place for computers in the national economy and society. Rather,
those were signs of the search for a way out of the increasingly diffi-
cult situation in information science.

In January 1974 a decision of the Government Presidium attempted to restore
a planned development of information science and to counteract the rising
separate efforts of individual ministries. However, the program adopted in
that resolution was never brought into effect. Industry has never been
given the amount of funds prescribed by the resolution, with the resulting
falling behind of the research facilities and excessive dependence of the
production program on licenses and import of parts from capitalist coun-
tries. In addition, foreign exchange funds were limited in the second half
of the 1970's, which primarily affected the output of computer hardware.

The computer industry, whose development was threatened by a shortage of
foreign exchange funds for purchase of materials and subassemblies, became
concentrated on manufacturing products for export--for obvious reasons this
export was mainly concerned with state-of-the-art product nomenclatures.
This in turn limited the possibilities for purchasing hardware by domestic
consumers, and, from the point of view of consumer interests, development
of computerization was hampered more by difficulties in forming configura-
tions that would be tailored to the real needs of the consumers or afford
opportunities for efficient utilization of this expensive equipment, than
by shortages in its supply.

The monopoly position of the computer industry in the nation, enabling it to
dictate its conditions to the market, resulted in installation across the
country of a great number of inefficient, obsolete computer configurations
doomed to inefficient use and made it impossible to introduce such informa-
tion systems that would really meet consumers' needs.

Consumers were also badly hurt by delays in software development. This was
especially true of Mera-300 units sold without proper software even for the
limited start-up period, while promises of subsequent added software were
never fulfilled. The quality and failure rate of the equipment and servic-
ing standards have caused and are still causing a great number of complaints.
This concerns especially R-32 computers and Mera-300 minicomputers.

The current strategy of information science development was adopted in the
above-mentioned decision of the Government Presidium dating back to Januuary
1974. According to that document, economic utilization of information
science was to evolve in the form of so-called government or institutional
computerized information systems.

The government systems were those of a particular importance for improved national planning and management. They were to become a tool for assisting top management levels with preparing and making decisions. In the framework of the government systems, ministerial information systems were to be created as its components. Their task would be to meet the information needs of the ministries and central agencies. Some of these aspired to more ambitious goals of automating all processes involved in handling of information within the framework of the ministry concerned.

The rank of the government information system was assigned to: information system of central planning (CENPLAN), system of state statistical information (SPIS), universal electronic system of demographic data (PESEL) and the system of scientific, technical and organization information (SINTO).

Institutional systems would be the information systems ensuring collection, processing and supply of information required for management of industrial, construction and transportation enterprises and other organizations (institutions) operating in the nonmaterial sphere and important for meeting the socioeconomic goals of the nation--cultural and educational organizations, health services, etc.

In addition to information processing necessary for management in institutional systems, the decision of the Government Presidium provided for development of work in the use of information facilities to control technological processes at large industrial enterprises, automate design work, engineering caclulations, etc.

Information Science in the Economic Reform

The changes in the nation's economic management principles and in the functions and organization of the management agencies (especially at the central level) and elimination of the intermediate management centers have placed the concept of information systems into an entirely new perspective. Priorities of applications of information have also changed drastically.

Reorganization of the central government apparatus, especially the branch ministries, conducted as an element of the economic reform strove to change the functions of this apparatus and therefore was bound to change its information needs. On the other hand, the existing infrastructure of information facilities in the form of ministerial computing centers and information links of these centers with the enterprises remained largely unchanged. This causes not only inefficient use of the available facilities and information personnel but also places this personnel in an unfavorable position of maintaining the existing information trends, which largely means perpetuating and strenghtening the traditional methods and style of management.

A critical reappraisal of continued operation of the so-called major information systems on a provincial or national scale is therefore necessary, especially those which were involved in the system of management by directive. Most likely, some of these systems in light of the current needs of management

may prove either superfluous or too expensive compared to the results of the operation. Some may have to be eliminated or drastically altered to adjust them to the real needs and capacities.

The institutional systems should also be critically reviewed. It is no secret that in the past, computer application and information science use often did not flow from conscious needs of enterprises but from various premises—such as the desire to appear up-to-date, pressure from superiors, the ease with which computerization costs could be offset by the Fund for Technological Progress, etc.

Many consumers have lately given up use of computer facilities. This has further aggravated the crisis in information science. Alongside the decreased number of centers and a decline in employment (which was mentioned earlier), the utilization of available capacities has deteriorated. Computer idle time for "organizational causes," i.e., mainly because of lack of work, has largely increased. There is also the disconcerting outflow of skilled personnel from the information area. This concerns especially system designers and programmers. Detailed data for 1982 are not available yet, but from fragmentary observations one concludes that the situation is worsening.

However critical or even tragic the situation may be, a real and practical program must be elaborated to repair losses and then gradually pass on to growth. Because computerization is here to stay. The longer it takes us to realize this, the more it will cost us to offset the consequences of wrong steps and negligence. There are hosts of examples proving that even today many areas in our life are lagging behind precisely because of primitive technology and working methods.

It would be difficult to prescribe here a panacea for overcoming the crisis in information science. Generally, we should avoid glib and facile programs which—as so many times in the past—often prove unrealistic or spurious. Instead, we should start serious discussions on the subject. It is important that the discussions be conducted not only among information scientists (that is, professionals), but also among information users. I believe that one of the causes for the numerous blunders in the development of information science in the past was a lack of activity on the part of information users, especially when setting goals and information contents for the new systems.

Most important would be a critical assessment of the current status of information science and of projected or operative systems, as viewed in the context of current and impending economic and social needs of the nation, as required by the new functions of the managerial organs of individual levels in the framework of the mechanisms of functioning and the legal system prescribed by the economic reform.

A consistent elimination of those elements of operative systems which are superfluous in the new management conditions or too expensive and have no

real chance for development should be undertaken. The technical facilities, personnel, office space, etc. freed in this manner should then be assigned to priority areas. Suggestions of "rush work" to overcome shortcomings seem impractical and threaten us with falling into a new series of errors.

The uses of information science should follow from the hierarchy of needs facing the national economy and should be defined by the consumers themselves in view of the current positive and negative experiences with the utilization of information science. The limited funds that could be allocated to this purpose in the nearest future will likely not allow to go beyond the areas of an obvious vital importance. These areas would include:

--a system of statistical information for central and local government agencies that would mainly carry the following types of information: data necessary for evaluation of the economic results of enterprises in the context of the economic reform (output, employment, wages, supplies, inventories, costs, financial results and balanced budgets); foreign trade turnover and financial estimates with cost effectiveness evaluation; agriculture and food industry, especially as regards implementation of the food production program, spending on agriculture and its economic effect; price dynamics and their effects on formation of the basic economic categories, and the people's economic situation; population data; labor reserves; living conditions; health, education, culture, etc.;

--banking and financial information systems covering financial services to economic units in socialized sectors and individuals;

--information system for transport and communication, including the meeting of the transport and communication needs of the population;

--system assisting with the calculation and payment of pensions and benefits;

--improvement of the in-house information systems of major enterprises, focusing attention on information support to self-sufficiency principles that will provide for processing data on enterprises' inventories, production costs of individual products, product quality, waste, loss, response to changes in control parameters, etc. Equally important is the neglected area of information uses at enterprises, which involves computerization of industrial operations, processes and industrial automation.

Procedures for meeting the need for information hardware should also be defined more precisely. We should never let the situation recur where the producer dictated to consumers what the latter should buy and use. Equipment quality should be improved basically, even if that would mean a cut in production. With the existing quality level, it is almost pointless to speak of the practical application of the equipment apart from few exceptions.

It should also be borne in mind that current practice will never return to the traditional concept of the so-called input processing. The modern data

processing systems involve much more active participation on the part of consumers in actual utilization of computerized data; this will require new hardware configurations, as well as much more sophisticated and precise programming systems.

It seems that, like in many other areas, more resolute and consistent cooperation with socialist nations should be developed in the area of information science, while seeking to limit the current excessive dependency of the information field on dollar markets.

Minicomputer Application Problems

[Article by Hanna Krzyszczuk, MS (Eng): "Problems of Application of the Mera-400 Minicomputers in Design Bureaus (from Current Operation Experiences)"]

[Text] Applications of the Mera-400 minicomputer in design bureaus were discussed by the Association for Mera-400 Design Applications at INFOPRO-79 conference. These aspects were also considered at the workshop-conference held in connection with the exhibition of design bureau equipment in April 1980, as well as at the Association's meeting during the course of the exhibition on the premises of BUDEXPO.

Even at INFOPRO-79 the need was expressed for fast delivery of computer units planned for 1979-80. This requirement was met. Mera-400 minicomputers have been installed not only in design bureaus but also in many colleges, where they are also used for design purposes.

It was also said that production and delivery in 1981-82 should be intensified, including supply of configurations with a tape memory, line printer, additional internal memory modules and disc memories. This requirement remained virtually unfulfilled, although some steps towards its implementation have been taken.

The Research and Development Center for Computer Technology and Measurements [OBRTKiP] has concluded an agreement with the Central Research and Development Institute of Industrial Construction [Bistyp] for three typical ultimate configurations of Mera-400 systems for design bureaus (Table 1). These principles were subsequently confirmed by the Research and Production Center for Computer Technology and Measurement [Mera-Centrum]. The principles include provisions for the ultimate configurations to be developed through expansion of basic systems already installed. Manufacturing Mera-400 minicomputers is projected, at least until 1985; the possibility of implementing the software of the Mera-400 on minicomputers of the new SM series without alteration of basic programs is also envisaged.

Table 1.

Configuration	Central unit	Operating memory (PAO) (K words)	Disc memories — cassette	Disc memories — floppy	Punch tape reader	Printer	Keyboard — DZM 180 KSR	Keyboard — CRT displays	Magnetic tape memory	Plotter**	Digitizer with graphic control monitor	Station for floppy disc preparation of data operating off-line; supplied by KFAP
I		32K	1	1	1+1	DZM-180	2	1	1**	1	–	1
II	MERA-400 with floating point arithmetic unit	64K	2	1	1+1 or 1+1	DW 3M +DZM180 as a	2	3*	1 or 2	Digi-graf** 1612 or 1712	–	1
III		96K	3	1	off-line as a res-erve	re-serve	3*	4*			1***	1...2

*Tentative number of terminals—to be updated based on experience with the efficiency of the main system.

**Plotter is connected either on-line or off-line.

***Optional (the digitizer to be connected after production starts in a CEMA nation).

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The plan for new production starts (Table 2) has been largely met. Production has been started of line printer DW 3M, which has an interface linking it to the Mera-400. Printers of this type manufactured by Mera-Blonie have been put into operation not only at OBRTKiP, but also at Bistyp, where it is functioning efficiently.

Tape memory PT305 has been interfaced to Mera-400 computers.

Production has been started of the control unit, and at the Design Bureau of the Meat Industry, PT305 have been connected to the Mera-400 system through a modular control unit.

Deliveries have been fulfilled of new configurations of Mera-400 with internal memories enlarged by one 32K memory module, using thin magnetic film (Technological Progress Center of the Bistyp Board). The situation is much worse with expansion of systems already installed. Like before, it is still much more profitable to the producer and supplier to provide new standard configurations instead of modules for their development.

Major progress has been made in the work on basic software for the Mera-400. New system processors SED, FMC, DAMP, and FORTRAN IV-S have been transferred for distribution by the BGD.

SED (Source Editor) is a processor used for creation, modification and storage of input data. SED has many advantages over the previously available UPD processor, namely:
--capacity for creating disc word files;
--capacity for testing disc files written by SED or UPD in the form of compressed character records;
--possibility for introducing a new operation mode--random processing where text modification does not have to be performed sequentially; and
--the possibility of handling character chains (searching for a given string of characters, replacement of a portion of the record, replacement of indicated characters).

SED is used successfully at Bistyp.

FMC (File Maintenance and Control) is a service processor of the above-mentioned disc cassettes. A disc Mera-9425 is subdivided in the SOM3 system into disc sections (logical devices). While the subdivision of the permanent disc cassette is established rigidly during the generation of the operative system, the subdivision of the interchangeable cassette when using the FMC processor can be described as arbitrary, defined in cassette metrics. The metric defines, among other things, the cassette name and the name, dimensions and localizations of permanent sections and headings for access to them, assignment of logical cores to physical cores, etc. For selecting data from accessory cassettes, one must feed into the system exact data, including cassette name, permanent section name and heading (1-20 characters in ISO7 code). FMC allows to change the cassette metric and in this manner protects cassettes from destruction and use by unauthorized personnel, as well as ensuring effective management of cas-

Table 2. Calendar for Introduction of the MERA-400 Minicomputer System

Equipment unit	Planned time terms for hardware and software inclusion into the MERA-400 system	Planned time term for marketing
Tape memory PT305	3rd–4th quarters, 1980	1981*
Line printer DW3M	3rd–4th quarters, 1980	1981
Semiconductor operating memory	4th quarter, 1980	1981
Soviet drum plotter	3rd quarter, 1980	–
X-Y writer format A3KL2	3rd quarter, 1980	1981**
Digigraph plotter 1612/3G, 1008/36, and 1712	1981	1981
Floppy disc module SP45-DE	1981	1981
Cooperation with the programmmed data processing station PSPD90		
—off-line through SP45-DE	1981	1981
—on-line through V24 interface	1982	1982
—on-line through multiplexer	after 1983	–
Multiplexer to devices operating according to BSC protocol, including Mera-Elzab alpha-numeric displays operating through a group unit	1982/1983	1983
Modules for cooperation with SM machines	after 1983	1984
Connection of MERA-7954 graphviewer	1981 (installed pilot) 1984	1984
Connection of MERA-400 to R32SOM3.1 (a new version of the operating system)	1982	1982
File processing system	1983	1983
Computer network processing system	1984	1984

*According to a statement issued by a Mera representative (October 5, 1981), the deadline was likely to be moved to 1982.

**According to a Mera representative (November 5, 1981), only several X-Y KL2 units were produced in 1981.

sette capacity. The processor has already been tested and made available to consumers together with the new version of operative systems.

DAMP (Direct Access Maintenance Processor), a processor serving direct access files, can operate with both sequential and random access files, allowing to:
--form new direct access word files;
--change information in word lists and connect lists;
--establish the contents of word lists;
--read out the contents of selected entries in a given format; and
--copy files.

The processor has been tested and is available to consumers.

FORTRAN IV-S, after pilot operation and debugging, has been made available currently to all interested consumers. Compared to the Fortran IV-E, a unit known to consumers, this system has the following features:
--it allows combinations of argument types in arithmetic expressions;
--a multiple substitution instruction has been introduced;
--use of artihmetic expressions for (input, output and step) parameters has been allowed in DO instructions; and
--a list of covert DO cycles has been introduced into the DATA instruction.

In addition, the module is five times as fast as the Fortran IV-E (at the compilation phase).

At Bistyp, the operation of Fortran IV-S has been tested, as well as the possibility of connecting, during the process of consolidation, the modules produced with the use of both types of compilers.

The BASIC-EXT system, put into pilot operation in January 1981, largely expands the language possibilities compared to the core BASIC system.

In particular, it allows:
--cooperation of programs with the file system (programs can select data from files and put results in them);
--program-operated program exchange--overlay;
--connection of programs from libraries, including subroutines in the Assembler language;
--creation of subroutines in which all objects are local, and transmission of data occurs in terms of formal parameters;
--creation of multiple definitions of a function;
--use of an ample inventory of instructions and standard functions of the BASIC language (67 instructions and functions), including 31 standard functions for accessory strings; and
--flexible system utilization with the use of 61 system commands.

BASIC-EXT includes all capabilities of BASIC language in its principal (digital) version. This means that with BASIC-EXT all previously introduced programs (except those for the programs involving access to internal circuits) can be utilized.

The manufacturers' efforts to develop the basic software have been supported by the consumers, who have worked out a great number of programs to complement the basic MERA-400 software package.

The DISPLAY program, developed by Design Bureau of the Meat Industry and put into circulation, facilitates the use of programs handling random access files. DISPLAY allows to list the direct access files in an arbitrary format, including selective listing of individual records and fields inside a record, detection of variable type errors (after previous definition of these types), initiation of disc sections, copying of disc areas and copying of storage files.

The ARDIS system, developed by the Marine Radio Boat Service in Gdynia, automates and facilitates the program operation in the SOM3 system.

It includes the following package of auxiliary programs:
DLS--double side printout;
DPT--paper tape description;
DFS--review and correction of contents of disc sections;
HED--printout of the program title cards; and
FLS--initiation of word list files on the discs (binary and alphanumeric) and their operation.

A package of procedures of task control language automating repeated functions in activation of programs has been developed. It has been disseminated (in an earlier version) to several design bureaus and submitted for circulation.

FSP (File System Processor), developed by the Design Bureau of Communal Construction in Gdansk, is also a service program for disc files. FSP allows treatment of selected disc sections as libraries containing various types of files (data, tests of source programs, binary programs) belonging to different users. The files are identified by names. Within one disc section, files of several independent users can be kept and protected.

Using the Branch Fund, the Gdansk Design Bureau of Industrial Construction has created many standard JCL procedures to implement transaction consolidation, activation and operation of programs based on standard libraries, as well as libraries compiled with the aid of the FSP program. A package of these procedures could be used by users of the new MERA-400 and could serve as a model in developing their own procedures.

MERA-400 users have thus become active participants in the development of MERA-400 software, especially as regards engineering user software development (according to requirements set forth by INFOPRO 79). This is clearly evidenced by the several dozen programs brought into operation and proliferation and listed in Table 3. The table mostly covers projects financed from central funds (and coordinated by Bistyp) from allocations on resolution of the ministerial problem R112, "Improvement of Design Methods and Technologies," and from the Branch Fund (KKOB). These programs are marked

by an asterisk. Information on these programs is available from Bistyp.
The programs themselves are available in operative versions from the
centers that have developed them. The cost of program transfer is 2
percent of program development. The cost of system installation on user
premises and training of service personnel is up to 3 percent of the devel-
opment cost. Training for data preparation and interpretation of results
(design personnel training) is up to 2 percent of development costs. The
cost of yearly program maintenance amounts to 5 percent of development
costs.

Programs developed from the design bureau's own funds can be made avail-
able at 12 percent of the development cost (including the license for pro-
gram operation). For orientation as to the costs incurred in compilation
of the program library (for most items), development costs are given,
while for some items availability costs are given (indicated by U).

The chart is certainly incomplete. Regrettably, not all data on com-
pleted projects are received by the association. Two positions in the
table deserve special mention.

The SIM-400.M package enables MERA-400 users to start development of
information retrieval systems searching for design personnel and other
types of data.

Another interesting software package is BIBRYS, the library of graphic
output subroutines prepared for the MERA-400, and a Digigraph line plotter.
BIBRYS already operates on the Nova 840 and Nova 3D minicomputers and
Benson, Economist and Houston instruments I Calcomp, as well as R32,
R22 and CALComp plotters. A BIBRYS version for the MERA-400 and Benson
(as well as the MERA-400 and KL2) plotter (after the start of its manu-
facture in Poland) is also envisaged. However, off-line operation with
paper tape does not allow to use the automatic plotter for automatic gen-
eration of design documents. One should wait until Digigraph is connected
on-line with the MERA-400, which will be provided by the general supplier
of Digigraph equipment--the Bureau of General Deliveries of Mera-Centrum*).
The Experimental Enterprise for Design and Introduction of Institutional
Mera Systems in Torun has implemented the interface for connecting the
Digigraph 1612/3G to MERA-400 on-line. A library of graphic output BIBRYS
is currently being installed for this configuration. The complete plan
for development of user software has not been fulfilled. The delays were
mainly due to repairs of long-term breakdowns of the MERA-400 by the Wroclaw
Research and Development Bureau of Industrial Construction and the Poznan
Design Bureau of Industrial Construction.

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*In 1981, in addition to fairly slow Digigraph 1612/3G and 1008/3G plot-
ters, the supply of 2.5 times faster Digigraph 1712 and 1208 plotters was
envisaged.

Three questionnaire surveys have been conducted among MERA-400 users concerning the difficulties involved in equipment operation (in November-December 1979, April-May 1980 and April 1981). Unfortunately, in spite of reassurances and promises of improved production quality control and better technical services, complaints of poor service are still received, while the promises remain unfulfilled.

What are the current problems with the introduction of the MERA-400 at design bureaus? For design bureaus which already have an installed MERA-400 system, the basic problems are involved in ensuring efficient system operation, proper basic software and user software (tailored to the design bureau's needs) and the possibility of further expansion of the configuration in response to growing needs. The design bureaus which only plan to acquire the computer system are faced with the following decision-making problems:
--whether to install the MERA-400 in the bureau;
--if so, in what initial configuration;
--what conditions should be provided for system installation;
--how the services are to be performed; and
--in what way to prepare for the introduction of computer equipment (training of service personnel, developing a library of engineering software, training of designer engineers).

As has been pointed out, the problems in basic software have been resolved successfully despite certain delays. Work on creation of user software continues.

One problem deserves special mention which is especially acute in the current economic situation at design bureaus. It is the problem of graphic output. Furnishing expanded MERA-400 configurations with Czechoslavakian DIGIGRAF 1612 and 1712 automatic plotters was envisaged in the basic decisions. Digigraf is the only unit (of automatic plotters available from CEMA countires) that is capable of creating technical documentation. After acquaintance with their operation--in particular development of the graphic output library BIBRYS--we are inclined, however, to recommend to design bureaus the Digigraf 1208, which features a smaller sized desk (1200 x 800) and much faster drawing speed (450 mm/s). The price of 4.5 million zlotys may also be important in purchasing decisions.

The Mera-Lumel factory at Zielona Gora plans to put into operation in 1981 the serial production of x-y KL2 plotters 297 x 420 in size. Obviously, it would not be an adequate substitute for the Digigraph, but--especially in view of the low price (250,000 zlotys) it could become a convenient form for output, for instance from statistical calculation programs (drawings of internal forces) or for generation of alternative drawings. Installation of the unit at Bistyp and implementation of the basic version of the BIBRYS library and development of programs for graphic output of PROBUS software are envisaged. No final decision concerning the manufacture has yet been made.

Design bureau users of the MERA-400 are aware of the conditions that need to be met to ensure efficient operation of the system.

The MERA-400 users believe that it is necessary to:
--improve the quality control of the currently manufactured MERA-400 configuration;
--make the production plans of the Mera-Centrum as regards producing,as a top priority,an adequate number of spare components and replacement subassemblies for systems already in operation;
--in the production plans of Mera-Centrum, modules of the MERA-400 (operating memory, disc memory, terminals) should be included for expanding the standard MERA-400 configurations according to the principles approved last year;
--develop the service manpower in qualitative and quantitative terms and set up regional services branches at Wroclaw, Gdansk, Lodz, Katowice and Krakow;
--supply the central and branch services with the necessary stock of spare parts and modules so that in case of an emergency the repair would be reduced to "diagnosis" and replacement of the entire failing subassembly;
--implement contracts for extensions and spare components to be supplied to those MERA-400 users who are capable of maintenance service of their own systems;
--provide to MERA-400 users the possibility for concluding contracts specifying the rights and liabilities of both parties, including the technical service of the MERA-400 (by service branches); this includes both warranty and post-warranty services; and
--authorize after appropriate training selected enterprises of office equipment services to conduct current maintenance and repair of MERA-400 peripheral equipment in order to reduce the workload of service teams and avoid employing special servicemen at each design bureau.

So much for the requirements for producers and suppliers.

What can be done by design bureaus? In the changed situation it should again be pondered whether some of the design bureaus could undertake the functions of a service branch and whether two or three bureaus could combine in using the services of peripheral equipment maintenance personnel. What can be suggested to design bureaus which have not yet decided to install the MERA-400?

Should they acquire a MERA-400 system?
● Yes, if they want to increase the scope of automation.
● Yes, if they want to be competitive in the export of design services.
● Yes, if they want to provide to designers the possibility for creative work and optimum solutions.
● No, if they want to install a MERA-400 system solely because others have done so or to raise the bureau's prestige.
● No, if they are afraid of difficulties.

How does one select a starting configuration?
- If there is the possibility for training and creating a basic software program at a nearby enterprise, it can be selected easily in keeping with the topical problems.
- If the training phase and development of software libraries are to be conducted on the enterprise's own equipment, the start should be from a zero configuration—that is, the standard configuration that is currently avaiable from the supplier.

How can conditions be ensured for system installation?
- The instructions "The use of the MERA-400 minicomputer system in Bistyp design bureaus" 30($112)W should be read.   Get in touch with the board of MERA-400 association users or the association's regional consultation center.
- One should take care not only of the machinery (which operate between 10 and 35°C) but also of the personnel, and therefore monitor the heat balance of office space and, where necessary, install air conditions (such as GDR-manufactured air conditions available from OPAM, Katowice). Power supply conditions should be tested and in the case of major voltage fluctuations (such as drops to 180 V) introduce voltage stabilizers.
- The possibility of subsequent system build-up should be taken into consideration when installing the computer (a space reserve, 3-phase electric circuits for the line printer to be installed eventually, etc.).

How to organize servicing of the MERA-400.
- Employ people who have had previous training in programming and operator service of computer equipment, or send at least one programmer and one operator to training courses, as well as one maintenance serviceman for MERA-400 units, allowing a sufficient lead time.
- Keep in mind that, although indeed no one is irreplaceable, having just one programmer or operator of the MERA-400 may mean that replacing him would take a long time.
- Conclude a contract with the producers servicing branch or ... ?

How to prepare for introduction of computer equipment.
- One should not only establish contacts with the association or a consultation unit, but also make use of MERA-400 computer time made available from a neighboring center equipped with the MERA-400 in order to:
--train employees using the producer's manuals;
--compile the program library; and
--train design engineers in the use of these programs.

To summarize, within the two years that have elasped since the last INFOPRO conference, chances for efficient utilization of the MERA-400 equipment system at design bureaus have greatly increased.

Further progress will depend on us, on our efforts in developing the system software and its proper utilization, as well as on our insistence in pressing our requirements with producers and suppliers.

Table 3. Programs for the MERA-400 Minicomputer System Completed for Operation and Promulgation.

Item no.	Program symbol	Program function	Language	Creators of MERA-400 program	Development cost, thousands of zlotys
1	2	3	4	5	6
1	PROBUS	Statistical calculations of two-dimensional wire structures (frames, crates, grids, lattices) and three-dimensional crates, including structures on spring bases and prestressed crates and frames, with consideration for the effects of geometric dimensions of assemblies and wire cross-sections. Maximum number of assembles = 250, wires = 750, support assemblies = 150.	FORTRAN	Bistyp	1610
2	ZELBET 80	Measurement of reinforced concrete elements according to PN-76/B-03264. The program measures rectangular, T-shaped and double T-shaped cross-sections: —bending: maximum load capacity, crack opening, flexures —compression: maximum load capacity with configuration of elasticity —distention: maximum load capacity —shear: calculating reinforcements in cross-sections for beam support. Cross-sections: rectangular double-bent, circular compressed and generalized cross-sections are measured for the maximum load capacity.	BASIC	Bistyp	886
3	MERAZELB 1	Comprehensive measurement with optimization of bent cross-sections of reinforced concrete elements according to PN-76/B-03264	BASIC	GdBPBP	390

[continued]

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1	2	3	4	5	6
	MERAZELB 2	Comprehensive measurement with optimization of eccentrically compressed or distended reinforced concrete elements with calculation of flexures and cracks according to PN-76/B-032664	FORTRAN		
4	STOPY	System for automation of design of building foundation supports, including: --calculating subsidence and passing ground pressure under the pile and evaluation of displacements with consideration of the effect of neighboring piles --formation of the pile shape --standardization of pile dimensions --reinforcement design --evaluation of material composition and steel grade	FORTRAN	Bistyp	1047
5	KAPPAM	Calculation of resistence characteristics of complex cross-sections (surface, position of the center of gravity, moment of inertia along the x-axis and the shape factor)	FORTRAN	Bistyp	80
6	KRATOWNICA -1	Calculation of forces in reinforcement wires and flexure of freely supported frameworks	BASIC	PBPBP	
7	RSNN	Calculation of voltage drop for low voltage generators	BASIC	Bistyp	37
8	RSNN	Calculation of voltage drop for high voltage generators	BASIC	Bistyp	37
9	OBC-W	Specification of projected loads by using the method of demand index K_z, selection of capacitor battery to compenstate for transformer and passive capacity (interactive and input modes)	BASIC	Bistyp	92
10	TZSM-2	Calculation of the cross-section of energy cables in low-voltage grids of industrial enterprises	BASIC	Bistyp	140

1	2	3	4	5	6
11	SKT	Current rating and verification of effi-cient calibration of electric energy con-sumption units placed at different points on a grid (interactive and intput modes)	BASIC	Bistyp	90
12	CANDELA	Evaluation of the illumination density by the point method based on point light sources with symmetric or nonsymmetric light scatter suspended at sufficient height and properly oriented towards the illuminated area, including projector lighting. Number of light points up to 500, calculation of 5 illumination com-ponents. Reflection from the floor is taken into account	FORTRAN	Bistyp	320
13	1. MERA-LUX 1	Calculation of the illumination for lamps with two symmetry planes, taking into account shades	FORTRAN	Gd.SPBP	320
	2. MERA-LUX 2	Calculation of the illumination den-sity with projector lamps, taking into account shades			
	3. MERA-LUX 3	Calculation of the illumination of areas by fluorescent and incandescent lamps--efficiency method			
14		Calculation of illumination by "light line method"		BPPL	
15	OCHRONA	Calculation of atmospheric air pollu-tion in terms of MAGTOS instructions. The program calculates: --short- or long-term concentrations for gases and fuels (spatial dis-tribution) --frequency of excessive concentrations (spatial distribution) --degree of emitter loading --distribution of concentrations along the wind axis --spatial distribution of fuel waste: maximum of 30 emitters, 30 fuel frac-tions, 1 emission period	FORTRAN	BPP	258
16		Calculation of heat loss from buildings (up to 600 m^3)		MK	Started 15U

[continued]

1	2	3	4	5	6
17	CENT	Calculation of installations of central heating and heating networks (adapta-tion of Bydgoszcz 11 program); maximum of 250 units	FORTRAN	ML	26U
18	Bydgoszcz 3M	Calculation of indoor installations of central heating and heating net-works; maximum of 155 units	FORTRAN	MK	15U
19	1. MERA-MENT	Measurement of ventilation installa-tions (rectangular, circular and spir-al-SP ducts) and low pressure pneumatic transport installations; maximum of 110 units, 70 terminal units	FORTRAN	Gd.BPBP	240
	2. MERA-NAW 1	Fan selection and evaluation of range of nonisothermal flows	BASIC	Gd.BPBP	
20	SPW	System for design of air and water ventilation and air conditioning sys-tems, pneumatic transportation system with a subroutine calculating non-steady-state thermal exchange	FORTRAN	BPPN	1095
21	WYMCIEP	Thermal and hydraulic calculation of pipe-in-pipe type heat exchange units. Steam-water and water-water units (a maximum of 40 types of units in the catalogue)	FORTRAN	BPPM	195
22	JSW-80	Hydraulic calculations of interior water supply networks (cold and hot water, taking into account circulation). Program executed according to instruc-tions for design of cold and hot water installation, 1980; maximum of 200 seg-ments, 20 types of sanitation equipment units	FORTRAN	Inst.Envi-ronm. Engi-neering, Krakow Polytech-nic	
23	STC 80	Calculation of installations for trans-port of loads under pressure. Program features: hydraulic calculations of pump stations (joint operation of a set of pumps) or pump systems, collectors, water supply networks; hydraulic cal-culations of pipeline networks with se-lection of diameter size for all or se-lected branches, hydraulic analysis of a	FORTRAN	BPPM	219

[continued]

33

1	2	3	4	5	6
		given pipeline network. Calculations embrace branch networks, direct-branch and direct up to 100 assembles and 100 branches			
24	AKUSTYKA 1	Evaluation of the level of noise penetrating through building partitions and acoustic parameters of buildings and partitions in individual pitch spectra and combined noise levels	FORTRAN	PBPBP	
25	JANKOL	Analysis of the stability of earth structures in conditions of effective stresses. The program produces in a digital and graphic form on a mosaic printer earth slope and sliding surfaces with the lowest safety factor calculated according to Bishop-Fellenius	FORTRAN	HP	30U
26	BULWAR	Static calculation of uncased and single- and double-cased trench walls	FORTRAN	HP	20U
27	OSFUNG	Static calculation of foundations (large-scale piles) in terms of gravity force and momentum	FORTRAN	HP	20U
28	COFKA	Calculation of water tables in naturally and artificially formed basins	FORTRAN	HP	30U
29	AWARIA AWAZ	Calculation of the wave forming upon sluice breakdown	FORTRAN	HP	20U
30	SLUZA	Calculation of internal forces and displacements in the bottom plate of a water sluice installed on an elastic base	FORTRAN	HP	20U
31	PEPIK	Calculation of the filling or emptying parameters of a sluice depending on the water pressure	FORTRAN	HP	20U
32	GEOMET	Geometric caclulations for design of communication lines and external networks such as point placement, segment length, distance, broken line length, angle of straight line intersection, segment azimuth and polygon field	FORTRAN	LBPBP	

1	2	3	4	5	6
33	MASY	Calculation of groundwork by using the method of cross-sections. The program produces: excavation and landfill surfaces, transverse and longitudinal workings and distances to intersection lines on the terrain	FORTRAN	LBPBP	
34	KOGI	The system of geodetic programs includes: --solution of symmetric isoline systems --typical geodetic calculations --project calculations in straight and curved line geometry: rectangular and circular crosssections, circular arcs tangential to 2 and 3 lines, transition curves (cuboid and equidistant lines to them), mapping of points onto straight lines	FORTRAN	WPG	
35	KCE	Automatic estimates based on KCE. Cumulative data covering 480 arguments from the following price list: MSTT20/630, KCE 9-60, 9-61, 9-58/1, 9/58-2, 9-58/3, 9-71/I, 9-72/I/R1, 9-72/I/R2, 9-72/I/R3, 9-72/I/R4, 9-72/I/R5, 9-72/II, 9-72/III, 9/73/I, 9-73/II, 9/73/III	FORTRAN	ML	44U
36	KCK	Automatic estimates based on KCK. Collection of data covering 500 items from the following price list: KCK 3-01, 3-19, 3-16, 6-08, 6-14	FORTRAN	ML	48U
37	ZBIOR	Automatic compilation of permanent data bases to KCE and KCK programs	FORTRAN	ML	Available with KCK and KC programs
38		Information system for Association's management	ASSEMBLER	ZREMB	
39		Compilation of an operational and financial schedule of a capital construction project	FORTRAN	MP	324

1	2	3	4	5	6
40	SIM-400M	Universal package for information processing and retrieval to be used in documentation work and file maintenance or smaller library systems, personnel file maintenance, particularly in handling data bases not larger than a few thousand records. The records can contain personal data of employees, bibliographic descriptions of publications, product specifications, etc.	ASSEMBLER	IIMTE	

41	ARDIS	Automatic programming in SOM3 system including a package of auxiliary programs:
		 DLS--double-sided printing
		 DPT--paper tape description
		 DFS--scanning and updating of
		     contents of disc sectors
		 HED--printing of program head cards
		 FLS--generation and processing of
		     binary and digital word lists
		A package of procedures in instruction control language has also been developed to automate iterative operations in activating a program
			ASSEMBLER	MORS	43U

42	DISPLAY	DISPLAY facilitates introduction and operation of programs using direct access files. DISPLAY allows: listing direct access files in an arbitrary format, including selective listing; elimination of variable errors; starting of disc sections; copying of disc areas; copying of stored files	ASSEMBLER	BPPM	40U
43	BIBRYS	A graphic output subroutine library for automatic plotters DIGIGRAF 1008/3G, 1612/3G; 50 basic and operational subroutines	FORTRAN	Bistyp	1610
44		Fortran library of mathematical statistics subroutines	FORTRAN	IMM	
45	FSP	FSP (File System Processor) allows to handle selective disc sections as libraries containing various files (data, source program texts, binary programs of different users identified by name and stores together)	ASSEMBLER	BPBK Gdansk	

*Glossary of abbreviations:

Bistyp –   Research and Development Center of Industrial Construction
              "Bistyp," Warsaw

Gd.BPBP –   Gdansk Bureau of Industrial Construction Projects, Gdansk

PBPBP –   Poznan Bureau of Industrial Construction Projects, Poznan

BPPL –   Design Bureau of Light Industries, Lodz

ZREMB –   Design and Project Bureau of Mechanization in Construction,
              "ZREMB," Warsaw

WPG –   Warsaw Geodetic Enterprises

ML –   [Miastoprojekt Lodz] Research and Development Bureau of
              General Construction, Lodz

MK –   [Miastoprojekt Katowice] Research and Development Bureau
              of General Construction, Katowice

IINTE –   Institute of Scientific-Technical and Economic Information,
              Warsaw

MORS –   Marine Radio Services, Gdynia

IMM –   Institute of Mathematical Machines

BPBK
 Gdansk –   Design Bureau of Communal Construction, Gdansk

BPPM   Design Bureau of the Meat Industry, Warsaw

HP –   [HYDROPROJEKT] Central Bureau of Water Projects Design
              and Development HYDROPROJEKT, Warsaw

LBPBP –   Lodz Design Bureau of Industrial Construction, Lodz

COMPUTER DEVELOPMENT PROBLEMS ASSESSED

Warsaw PRZEGLAD TECHNICZNY in Polish No 21, 22 May 83   pp 8-9

[Article by Donat Zatonski]

[Text]   Several months ago when I decided to write about the problems of information science and the computer industry (PRZEGLAD TECHNICZNY, No 2/83, "Self-Examination With a Weak Culminating Point") I had some doubts as to whether or not this is a good subject to bring up during such a difficult period. I was receiving alarming reports to the effect that during the economic collapse and within the framework of self-management and the economic realities, in some enterprises information science was regarded as being persona non grata, an unwarranted luxury. Here and there it was suggested that the computer centers be eliminated and put to use for social purposes, for example, a mess hall in place of a center. It is impossible to be the judge in similar cases.

It is worthwhile at this point to cite the opinion of a specialist on computer equipment. He states that information science is a constantly innovative field and that, just as in the case of all innovations, its life is the more difficult the deeper the economic difficulties are. He says further that these days we should not start with a discussion on the subject of computers and hardware, but with a search for the answer to the question: what is, and will be, the demand for computerized-information services in enterprises in which cost effectiveness is supposed to be the only and most important determinant of activity but which today find themselves tossed between the crisis and the incessantly changing rules of reform. It is small wonder that under these circumstances some believe information science to be a burden.

That is precisely why I had my doubts as to whether the subject of information science is timely, since this field has been affected by extreme stagnation. It turned out that I was wrong. Here someone made the right decision, to "put some life" into the subsector: Representatives of the larger industrial information-science centers were invited to Wroclaw for a 2-day conference. Almost 70 computer-machines and system users attended. The meeting was held 20-21 April.

In the Same Boat

The specialists know that we have not gone far in computer-equipment development, despite the fact that the beginnings were promising. In the initial period the Wroclaw center, headed by ELWRO, played an excellent role. There was enough of this development to become convinced that applications of information science are an objective necessity for the economy.

But the truth is that our information science is based on equipment that the leading countries of the world used in the 1960's. Without going into the reasons why development in our country has been set back, we are in a place, and in a situation, where we must protect what we have attained, at any cost. Several years we were among the leaders in this field among the CEMA countries. Today we have little to propose to our partners, and in reality, we are counting on their support.

It is a known fact that all of the CEMA countries have invested a great deal and are still investing in development of the RYAD Uniform System. This is also the strategic direction for our computer industry and there is no alternative here. I listened attentively to the deliberations. I know how such meetings went in the past—the hardware users most often raged, not without reason, at the producer's monopoly and the disastrous practical effects that ensued from that monopoly. When the producers were backed by power, and there were such periods, the users were gagged and ostensibly everything was in order. For many years each side developed its own methods of conduct—each went down its own road. This time I got the impression that the producers seemed to have drawn in their horns, and the users, too, were far less aggressive. It is hard to decide whether it was the joint misery that neutralized the animosities or whether some elements of reform had already played a part and it was decided that politeness does not cost anything and may even pay.

The slogan at the conference was: "Development Prospects of the Information Systems in ODRA 1305 Technology." It turned out rather quickly that the slogan was aimed more at gaining the attention of the users than at reflecting any substantive truth, for there are no prospects for ODRA, and all it has to do is make it possible to live through the next 5 to 10 years, to the time that the RYAD Uniform System is in general use. Of course, the users are defending the achievements that they have managed to scrape together over many years, often despite circumstances, and they are not inclined to quickly go to a new system, particularly since the introduction of this system has been proceeding at a snail's pace for many years. The producers, on the other hand, are fighting for their own future, in which the ODRA computers no longer have a place. But they are also aware that they are responsible for the efficiency of the application of the new system, and here they are not sure of themselves.

To Catch Up With Oneself

The foundation of Polish information science are the machines of the ODRA 1300 series, and among them the most popular and most modern (?) is ODRA 1305, of which there are over 200 installed in the country's centers. It is no secret that most of these computers are of a configuration that is inadequate, and a considerable part of the hardware is worn out, which, with a perpetual lack of spare parts, makes operation difficult.

Under this state of affairs, when the representatives of industry presented their plans which, as always, sounded optimistic, skepticism prevailed in the hall. Despite mutual understanding and respect, retorts from the users made some corrections in this picture. Here are two voices from the discussion. I cite them almost verbatim:

...I walk on earth—I have problems with spare parts. When our center since 1977 has been applying to ELWRO for spare parts and only 9 to 14 percent of them are being supplied, why are we talking here about whether ODRA will last another 6 years? We must exert pressure on ELWRO so as to enable the installed hardware, which is worth billions of zlotys, to be maintained at the proper efficiency. We have line printers in our configurations that operate three shifts at a load of 6,000 hours annually, and that is how it has been for the seventh year now. We are working this equipment to death! I hear lofty slogans here—about teletransmission... Let us get back down to earth! At one time the period between failures for ODRA was five to six times that of the RYAD being produced then. On a worn-out configuration, which I use in the basement and that is why I cannot install memory disks, I must use memory tapes. This configuration at one time operated 50 to 60 hours between failures. Today, because of lack of spart parts, I have a failure every 15 hours...

It should be added to the above statement that the Wroclaw Electronics Works ELWRO, as the general supplier of the machines, takes most of the heat for all inadequacies, the poor quality of equipment and spare parts, and the untimeliness of the deliveries of these parts. This is proper, although the subcontractors which hide behind the back of the general supplier, are also guilty.

Here is the utterance of another user:

...No one is concealing the fact that ODRA needs new equipment very badly. So why are there so few line printers? Whey are there no 30 MB memory disks? My order for 30 MB disks has been laying at ELWRO since 1978. They keep telling me that I will have them in 6 months... Why cannot the ELWRO electronic engineers design a control unit similar to the one that works with 8 MB disks? I am not an electronics engineer, so maybe I am wrong, but is this impossible? But I am asking—what is lacking? People? Money? Foreign exchange? Tell us, if ELWRO doesn't have the money we'll make a contribution. We will finance what is needed through a collective agreement or by forming some kind of stock company, which will be better than the activity of an obligatory-type association. Dear ELWRO workers—I see no reason why this cannot be settled quickly. These 30 MB disks may turn out to be unnecessary in 2 or 3 years! I have an ODRA that is fairly well expanded, and the RYAD is awaiting installation.

We will definitely go to RYAD, but we will not discard what we have in ODRA.   We are using approximately 100 subjects, from two-program to 60-program. ODRA must last for the next 5 to 6 years!

The above utterance is probably the guiding theme of the meeting: what can and should be done so as to keep the ODRA series machines in operation for another few, and in the opinion of many, several years.

There is No Alternative

For the producer of main units, i.e., for ELWRO, production development depends on the RYAD computer, and the entire program is subordinated to that. For the users of computer hardware, the matter is not so unequivocal. Those, who despite difficulties, completed and often expanded a system based on the ODRA 1300 series, are protecting their achievements against an uncertain fate. Their reasons are based on economics, and at least for the present, are justified.

Because the implementation of the program has been delayed there are no advanced applications in Polish industry on the RYAD computers. And it is precisely that which would serve as the best guarantee for the transfer of applications from the ODRA 1305 to the R-32. The costs of reprogramming the systems from one to the other are high and comparable to the costs of developing a new system. The cost of comparable applications systems for the R-32 computer is twice that of the ODRA 1305. The producers, under pressure of questions, promise that, for example, they will equip R-32 main units with a 2-MB memory based on semiconductor engineering (this will increase the operational store). Mera-Blonie promises that a line printer is being modernized and that "they are doing everything possible" so as to make it possible to purchase it ("who are they talking to", whispered a computer operator sitting near me). "Attempts are being made" to adapt the R-32 machine to a 100-MB-capacity store disk configuration. We will buy these disks from the Bulgarians, who at one time learned computer engineering from us. A PT-5 tape store, more modern than the PT-3 (about which I wrote in the early 1970's in PRZEGLAD TECHNICZNY) is being promised. "Work is being done" on a pick-up channel making it possible for two R-32 machines to work together. Because the R-32 machines are compatible, from the functional standpoint, with the IBM machines which are quite popular in Poland, it is possible that the IBM programs may be transferred to the R-32. There are a lot of promises from industry, but the matter of setting deadlines is something else.

In order for the computer operator to get through this difficult period, the ODRA machines must be maintained and further equipped. The general conclusions from the conference were aimed specifically in that direction, and the users added their own suggestions, directing them mainly to the producers. I will give some of them, with the warning, however, that they are incomplete and are of a working nature, because there will still be another similar conference, at which users of digital computers used in administration will be present, and only then will all of the proposals be complete.

The demands are addressed mainly to the Wroclaw Electronic Works ELWRO. It is proposed that the incomplete ODRA 1305 configurations be expanded in three directions: operations store, 30 MB and 60 MB disks, and the so-called communications, adapting the machines to multi-access operation. It is urgent also that disk controller and data processor problems be solved. It became quickly apparent in the hall that 60-MB memory disks are beyond reach because no one in the socialist countries intends to produce them and money is not available to purchase them from the dollar countries. At the same time the users showed little interest in the 30-MB disks, which was confirmed in a survey that was conducted and which disturbed the representatives of ELWRO who pledged a threefold higher processing capacity. It seems that reform has had an effect and economy does not allow for commitments to purchase.

The most important problem is that of transfer from the ODRA systems to the RYAD system with the least possible conflict. Proper technical preparations are essential for such an undertaking. The emulation conception was presented at the conference, and it was also promised that work on a emulator would be intensified.

The users demanded that the emulators be made available to them no later than 1986, and furthermore, that the application of emulators not increase processing costs

in relation to those   incurred on ODRA 1305 machines. The users also called for
a guarantee that there be a gradual module exchange of the used ODRA system while
maintaining continuity of operation. This stipulation is considered to be very
important because enterprises will not approve the total, once only, cost of ex-
changing a kit assembly, because, for example, a RYAD assembly costs approximately
50 million zlotys. The individual modules should be the same as in ODRA. Work
on rapid-programming tools for the RYAD digital computer system must be intensified.
The ongoing modification of user systems will make this possible, which in turn will
make possible to accurately adapt the output of the system to the needs of the
direct user.

These are the basic conditions which ELWRO must fulfill if the RYAD system is to
be genuinely accepted by the advanced users of the ODRA computers.

There was also a proposal that ELWRO not stop production of the ODRA 1305 as long
as there is a demand for it. It was demanded also that it be possible to purchase
a main unit "alone", aside from the entire configuration, so that obsolete types,
e.g., ODRA 1304, could be replaced. It was suggested that in this way industrial
enterprises can be assured of computer information services for 15 to 20 years.
The director of the General Deliveries Office in ELWRO countered these demands
immediately, arguing convincingly that the profitability criteria for the production
of these machines is already greatly strained, since in the last 2 years 16 main
units were produced each year. The competition in the socialist countries, e.g.,
the Soviet Union, produces 1,000 computers in each of two factories, which allows
for a totally different distribution of costs. The production of 1, 2 or 3 machines
annually is unacceptable, because their price would be absurd.

I have recorded only some of the conflicts of opinions and the demands submitted.
The list is long and if each point were to be really given attention, and an analysis
made of what is in the common interest of users and producers and what separates
them, how this mosaic of wishful thinking and feeble possibilities can be glued
together--then perhaps faith in Polish information science would be restored. Today
it seems to be calmer, more reconciled.

In order to live through this difficult period more easily, it was decided to react-
ivate the ODRA Computer Users' Club. Within the framework of its activities answers
will be sought to the questions: how will the ODRA system develop further, how can
its effective operation be ensured, what are the possibilities of modernizing the
configuration of this system? Is RYAD a development prospect for the ODRA computer,
and if so, how can the conversion of the program be ensured? Doubtless exhausting
answers to these questions were not obtained at the conference, but it is well that
such a meeting of producers and users took place.

9295
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COMPUTER TRADE, COPRODUCTION WITH USSR DESCRIBED

Warsaw ZYCIE WARSZAWY in Polish 25 May 83 pp 1, 6

[Article: "Polish Assemblies for Soviet Systems, Microprocessors From USSR for our Computers, 275,000 Calculators To Be Imported, Metronex Expands Trade"]

[Text] (Own Information) Everything indicates that at the upcoming Poznan International Trade Fair the Metronex foreign trade concern is planning to sign contracts with Soviet partners for export which will include about 80 percent of the projected deliveries for 1984.

This is the result of splendid cooperation thanks to which mutual exchange becomes an element that makes possible the planning of production, in both countries, that requires lead time.

We are informed by Andrzej Ziaja, director of Metronex, that the value of the deliveries made through his clearinghouse to the Soviet market will reach 150 million rubles. All indicators point to next year bringing more trade as a result of the integration of the industries in the two countries. In the electronics field that encompasses computer hardware, control and measuring instruments, cooperation between the two countries has permitted a large degree of independence from supplies purchased in capitalist countries for foreign exchange.

From information given us by Stanislaw Kurek, director of a department that deals with the problems of cooperation with capitalist countries, it appears that in the leading possition of the Polish electronic export to the Soviet market are printers, cassette memories, floppy discs, and input/output units. In the last several years the minicomputer systems, MS-4 and Mera-60, have occupied an important position, together with systems such as Moesbaur and Camac. The sales of control and measuring instrumentation, and radioactive gages are increasing.

In the framework of task division Polish apparatus used in Soviet computer systems has become a valued specialty. In turn, Metronex imports Soviet microprocessors for its microcomputer systems. The microprocessors fully meet the specifications of that industry.

Because of our limited investment we import fewer large computers from
the USSR, but several such as the R-35 and R-60 are known to the Polish
market. At the Main Computer Center [ZETO] in Katowice, our largest
urban-industrial center, an R-60 computer is used to service a banking
system. Thanks to the fact that expert operators are available at the
center this computer is almost fully utilized, while users have high
praise for the equipment.

At the upcoming Poznan International Trade Fair, the Metronex management
informs us, it is their intention to sign contracts for a large part of
the equipment to be imported from the Soviet Union in 1984. Items to be
purchased are processors for mini and microcomputers, and electronic
measuring equipment. In the last group are items praised in the Polish
market--that is--manometers, induction flow meters, and memory oscilloscopes
purchased for the design bureaus. At the fair it is planned to discuss
the further purchase of utility, pocket, and engineering calculators from
the USSR. On the basis of contracts already signed by Metronex we
envision the import of 275,000 calculators of this type in the current
year. This will enrich the domestic market.

Discussion, independent from current deliveries, is continuing about the
possible expansion of cooperation and exchange in this area during the
next 5-year period, 1986-1990. An important factor which may help to
establish a long-term undertaking is the fact that Polish electronics firms,
especially Mera-Blonie, have achieved success in using Soviet made parts
in the apparatus they produce. Before this, these parts had to be purchased
from capitalist countries using free foreign exchange. The parts were
proven in this apparatus. The basic matter, of course, is the quality
and durability of the products. In the next few years production of
printers will rely on Soviet made parts which conform to world standards
in the field.

Progress in the field of professional electronics is rapid due to the
possibility of using Soviet subassemblies. Our industries can count
on a dependable source of supply, a most important factor. The mutual
exchange and filling out of each other's manufacturing potential allows
a systematic decrease in the input of free foreign exchange into this
important manufacturing field.

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CSO: 2602/23

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COLOR PHOTOGRAPHS AID ELECTRON MICROSCOPE ANALYSIS

Bucharest STIINTA SI TEHNICA in Romanian No 3 Mar 83 p 6

[Article by Dr. Lucian Gavrila: "Immunology and a Remarkable Romanian Contribution to Electron Microscopy"]

[Text] Living organisms are equipped with various defense mechanisms which allow them to prevail in the constant struggle against noxious elements in their surroundings. There are defense mechanisms at the molecular level such as the repairing and protection processes. With their assistance, injuries caused in the DNA by physical or chemical mutagens are repaired and eliminated. Most important for major organisms, however, are the immunological defense mechanisms. With these, the organism has the capacity to recognize the difference between that which is its own (self) and that which is not (non-self). It annihilates and destroys the invading agents of various kinds (chemical, microbial, etc.) which tend to alter its morphofunctional integrity. The principal weapon of immunological mechanisms is antibodies also called immunoglobulins.

The physiological mechanisms of the immune response which condition the immunity of an organism (free of contagion) are of two types: non-specific--representing inborn immunity and based on the activity of polymorphonuclear leukocytes, monocytes and lymphocytes--and specific-- representing adaptive immunity based on the activity of lymphocytes and plasma cells.

When an antigen invades the body, it is met initially by phagocytic mono-nuclear cells which belong to the reticuloendothelial system; they are of two types: mononuclear phagocytes circulating peripherally or monocytes and macrophages found in the lymph nodes, the red hematopoietic marrow, the spleen etc.

It has been demonstrated experimentally that the monocyte can evolve into a macrophage. During the differentiation of the monocyte from the precursor cell (the promonocyte) and during its maturation it acquires phagocytic capacity and membrane receptors for immunoglobulins. Extering into the bloodstream it can cross into extravascular tissue and there undergo transformation into a macrophage. The fate of a macrophage formed in extravascular tissue is different. It can die "on the spot" or it can

migrate back into the peripheral blood, living in some cases up to 3 months without dividing although it maintains its ability to reproduce and divide. Macrophages are involved in both primary and secondary immune responses. They can activate the antigen-sensitive lymphocytes--"bestowing" the antigen in an appropriate stimulating form--or product a soluble factor which will activate the lymphocyte. Cinematographic techniques have demonstrated peripolis, the movement of the lymphocyte on the cellular surface of the macrophage and emperipolis, where the lymphocyte penetrates the macrophage's cellular cytoplasm. The lymphocutes collect around the macrophage and maintain extended contact with it through extensions of their cytoplasm called uropods.

Electron microscopy has demonstrated the fusion between the macrophage's and lymphocyte's cytoplasms, suggesting a transfer of cytoplasmic material. The phagocytic cells of the reticuloendothelial system capture and localize antigens within themselves through phagocytosis or pinocytosis. After ingestion, the antibodies can be broken down by enzymes associated with lysosomes. The macrophage receives and "swallows" the antigen, keeping it in inclusions, some being simple lysosomes and others more complex phagolysosomes.

The antigenic determinants prepared during this time arrive at a nearby cell sensitive to antigens and unleash an intense production of antibodies. However, it is possible that the simple retention of the antigen on the macrophage's membranes will allow direct contact between these and the lymphocytes thus inducing the formation of antibodies. On the other hand, the antigen bound to the macrophage's membranc can be transferred to the lymphocytes. The direct macrophange-lymphocyte interaction between the membranes depends on the reactions between the surface cellular structures which are products of the genetic complex of histocompatibility.

All of this data attests to the direct participation of the macrophage not only in antibody production but in fixing and maintaining the antigen. Among the lymphocyte population there are cytotoxic cells known as killer cells. Found in the spleen, the lymph nodes and bone marrow, they appear as small lymphocytes and do not act against target cells covered with antibodies; they can destroy certain leukemic cells. However, much remains unclear about these K cells. The K lymphocytes do not have clearly defined membranc characteristics and are cytotoxic for a variety of target cells.

Immunology in general and genetic immunology in particular are extremely engrossing and complex fields and there are many "blank spots" on the map of human understanding. The Nobel price in 1980 capped the pioneering, indeed, revolutionary, work of certain researchers, such as American professor G. Snell (who demonstrated the major system of histocompatibility in mice), French Professor J. Dausset (who demonstrated the major system of histocompatibility in man) and American professor B. Benacerrat (who demonstrated the histocompatible mechanisms).

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Electron transmission and scanning microscopy has brought many clarifications in the study of immunological processes. The, extremely complex cellular and molecular interactions outlining the immune response for normal organisms in various pathological cases have been and continue to be an ongoing concern of the electron microscopy laboratory at the "Pasteur-Bucharest" I.C.V.B. [Institute for Veterinary Research and Biological Preparations]. Doctor Nicolae Manolescu, recipient of the Academy of the Socialist Republic of Romania award, has earned acclaim for his original reserach known and renowned at home and abroad. Much of this has been gathered together in the monograph "Luekemic Cells" written in cooperation with Dr. D. Micu and published by Editura Academiei R.S.R. 1981.

His interest in perfecting analytic methods in electron microscopy scanning recently produced--through pseudochromatics--the first color images--on the electron scanning microscope--of certain blood cells, using various techniques (linear, logarithmic and antilogarithmic techniques, singly or in combinations). Obtaining these color photographs was made possible through the use of the Optimiscope R. 05 C, produced by the "Traian Vuia" Polytechnic Institute in Timisoara as the result of the joint work of Doctors N. Manolescu, Dan Paltineanu, and R. Begnescu and Engineer Mircea Fildan (under the direction of Professor Doctor Anton Policec). Color imagery presents much more important and interesting details than black-and-white as can be seen by comparing the photographs on the cover and on this page showing the "killer" relationship between a macrophage and a B lymphocyte (enlarged 10,000 times). We are confident that this extremely sensitive method of showing in-depth aspects of membrane relationships will place Romanian biomedical research in the forefront, where it belongs in the world hierarchy.

12280
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AUTOMATED HYDROMETEOROLOGICAL WARNING SYSTEM DESCRIBED

Bucharest STIINTA SI TEHNICA in Romanian No 3 Mar 83 pp 9, 11

[Article by Dr. Constantin Nedelcu]

[Text] In the spirit of the RCP Central Committee decision to improve
the socio-economic information system and to introduce management systems
using automated data processing, and in line with the provisions of the
long-term national program for organizing hydrographic basins in Romania,
the National Water Council [CNA] has proceeded with the development and
modernisation of the water and meterological information system. This
activity is fully underway and is essential to properly provide for
meteorological and hydrological programs, to defend against the effects of
dangerous hydrometeorological phenomena and to protect and use the
country's water resources.

Among the many aspects which characterize the current and long-range
evolution of this massive information system, we have chosen to examine the
automated system for hydrometeorological warnings of floods (SAAHI). This
is a new system of major interest to our country. We spoke with CNA
Engineer Ovidiu D. I. Popescu, specialists from the CNA computer center
and with the center's director, Corneliu Popovici to learn more about the
system's operations, characteristics, and the extent to which it has
been implemented. We are particularly indebted to Director Popovici for
much of the information presented here.

The damaging hydrometeorological events in the past two decades, especially
the 1970 and 1975 floods, were extremely injurious to the national economy.
Statistical calculations on the floods show that these losses have tended
to increase with the increase in the number of socio-economic constructions
in the flood areas. To this, one must add the indirect losses suffered by
other units not flooded, which were caused by the interruptions of economic
exchanges during and after the floods.

Both the complexity of the process of making decisions in regard to
protection against floods and the complexity of the hydrometeorological
phenomena as well as the importance of the socio-economic interests that
are threatened require solid data and analysis regarding the interests to
be protected and the hydrotechnical systems in the region, in the specific

hydrometeorological context. Data necessary to quickly protect against flooding is obtained and used in an information-decision and execution system made up of the following principal links: Protection planning--data collection--transmission--processing--decision--action--monitoring the action and evaluation of the results.

The quality and quantity of the information are essential factors in determining the quality and speed of decision-making, and protection measures and their economic effectiveness. The speed with which meteorological phenomena occur requires, for timely decision-making that the information be obtained every 15 to 20 minutes while with hydrological phenomena the time to develop varies from upstream where processes occur rapidly, to downstream where it may be in the order of hours or tens of hours.

The great floods of 1970, 1972 and 1975 which included most of the country's waterways demonstrated that the existing informational system was on the one hand, deficient in sufficient timely information and on the other, "suffocated" with data. (The system's equipment was no longer able to satisfy the great flow of necessary data and the phenomena were not well "covered up." Some 66 percent of the flow in our country's rivers is generated by rains and melting snows in the mountainous regions, and these essential regions for this rain/run off phenomena are generally uninhabited. Thus, data collection cannot be carried out by human beings and, in the majority of cases, we have information about phenomena only after they have occurred, in other words, from populated areas where damage has already begun and when it is too late. These shortcomings imperil the accuracy and speed of forecasts and warnings and reduce the time for taking preventive measures.

But let's look at an example. Suppose that along a river in the mountains where flooding is extremely rapid there is work going on using valuable equipment, If preliminary information concerning an imminent danger arrives too late, the evacuation of equipment and material becomes impossible and the flood can even trap personnel. Of importance here is the "speed" of the forecasts and warnings and equally important, their accuracy. If a (faulty) forecast indicates that the "evacuation quotient" will be reached at a large project in the flood area, and the proper precautionary measures are taken, and if the flood does not reach forecasted levels, then all the expenses of evacuation and return as well as production interruptions go down as unjustified losses.

These kinds of important socio-economic consequences illustrated here justify the need for an information-decision system for flood protection. Mobilizing specialists to modernize information, forecast and warning activities for dangerous hydrometeorological phenomena will allow us to overcome deficiencies such as described above.

Currently, the collection and concentration of hydrometeorological data is carried out on four levels: level "0" is made up of the first data collection positions (weather and hydrometric stations and rain-gauge positions); level "1" is composed of a selection of primary points where

the information from all primary positions (meteorological stations and hydrological collectors) is collected; level "2" is made up of regional forecast centers and basin centers for flood forecast and warning and level "3", headquarters, is composed of the Institute of Meteorology and Hydrology in Bucharest (IMH--which gathers data from both the internal network and the international grid for the entire northern hemisphere) and the CNA dispatcher within the permanent operation of the Central Commission for Protection Against Floods.

In the discussions we had at the CNA's computer center with the young specialists Cristian Filip, Ion Poiana and Ion Bogdan, we discovered some interesting details about the modernization process currently underway. Through the phased completion of the existing hydrometeorological mechanism we are achieving--with zonal systems of automatic stations--the automation of the long-distance transmission of data and the rapid automated processing of data both at the central level as well as in the large hydrographic basins. Thus, level "0" has automated weather and hydrological stations; level "1" has radio-relay stations for collecting and forwarding messages from the automated stations; level "2" has minicomputers, while level "3", the CNA computer center, has among its duties, functioning as the national center for collecting and processing hydrometeorological data. Toward this end, CNA undertook studies in past years to establish an information system in the upper Mures hydrographic basin, in Siret, Buzau and Arges as well as at IMH [Institute of Meteorology and Hydrology] in Bucharest.

The first automated system is the one implemented in the upper portion of the Mures hydrographic basin. The system is composed of 23 automated stations equipped with meteorological and hydrographic sensors and controlled by a minicomputer located at the headquarters of the Mures-Banat Directorate of Waters in Tirgu Mures. The system operates as follows: Every six hours the computer calls over the radio each automated station in order. The station in turn questions every sensor and transmits a message containing all of the sensors' data. The computer compares the figures received with predetermined standards. When a certain "threshold" is passed--for example when the water level reaches an "attention mark" at a hydrometric station, the interval between transmissions is changed and the station is called every 3 hours or every hour.

Based on the experience gained in this project, a larger hydrometeorological automated warning system for floods has been designed and implemented. It interconnects with the national center for gathering and processing hydrometeorological data, established within the IMH. The four regional data collection and control centers, two in the Siret basin (in Bacau and Suceava), one in the Buzau basin (in Buzau) and one in the Arges basin (in Pitesti) each control a series of automated meteorological and hydrological stations. Each regional center has a minicomputer, the Independent-100, which accomplishes the same task as the mini-computer in the upper Mures basin. And it is further intended for it to collect hydrometeorological data through telex lines from the county stations. Likewise, at the waters directorate headquarters in the Siret, Buzau and Arges basins, there are plans to gather hydrometeorological data both from manned stations as well as from automated ones.

The four zonal centers are connected by telephone lines to two mini-computers for teletransmissions from the CNA computer center in Bucharest. For automated data processing, the computer center has a Felix-C 1024 computer configuration. Also, to ensure the continu-d functioning of the entire forecast and warning system, there are plans to install another medium capacity computer.

But How Does This New System Operate?

The specific application programs for each regional center collect messages from the automated stations. Similarly, data collected by telephone or radiotelephone from the human operators, who are at most primary data collection points, is sent to the telex machines at the county hydrological and meteorological stations and from there to the Independent-100 mini-computers at the Regional centers, where the data is stored either permanently or temporarily. Here the messages are formulated that are transmitted to the computer center where the mini-computer places them on discs and magnetic tapes along with the messages received over international lines.

Using magnetic tapes, messages are introduced into the computer for the automated processing of data necessary to prepare meteorological and hydrological forecasts. The processing is executed in accordance with complex mathematical models which calculate the water flow on the basis of the precipitation falling in various areas as well as of many other parameters of the hydrographic basins in question. The forecasts are verified by highly experienced IMH specialists and then transmitted over the reverse channels to the regional centers. These in turn communicate them to the decision-making organs in their areas of responsibility.

The automated hydrometeorological warning systems for floods detailed briefly here constitute only one of the ventures in information systems and cybernetics and hydrology. There are also automated systems for monitoring water quality and activities to create meterological, hydrological and water management data bases.

For the coming years, the CNA is working to intensively and extensively develop a specific information system for effective modernization on a national scale, in line with practical necessities.

In regard to the concerns for "the future which begins today," let me mention, among other things: interconnecting the automated system in the upper Mures basin with the CNA computer center; finishing the nearly-completed automated systems with new automated hydrometeorological stations; diversifying the equipping and functionality of these systems so that they can serve other activities (water quality protection,

supervising performance during hydrotechnical constructions, basin-wide
coordination of the uses of hydrotechnical operations etc.) and,
establishing automated systems with similar multiple functions in all
the large hydrographic basins in the country.

Specialists view development along the lines mentioned here as a necessary
condition to ensure the efficacy of all the measures called for in the
national long-range program for planning the hydrographic basins in the
Socialist Republic of Romania.

12280
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DEVELOPMENT, ADVANTAGES OF HIGH VOLTAGE RECTIFIER DESCRIBED

Bucharest STIINTA SI TEHNICA in Romanian No 4 Apr 83 p 2

[Article by Valeria Ichim]

[Text] Today, under the conditions created by the worldwide scientific and technical revolution, no country in the world, no matter how developed, can solve all its problems solely with its own material and intellectual resources. But it is equally true that no country, no matter how wealthy, can afford the luxury of endlessly paying others so that it may develop and bring renewal in all areas. All countries, and developing nations in particular, are seeking to unburden their budgets of the foreign debts created by massive importations of modern technologies and equipment. In our case, this is the motive that guides our scientific and technologic research. The efficient exploitation of our own resources, and the formulation of necessary technologies, are demanding from our researchers a constant creative effort whose concrete results in many cases are inventions and innovations. But we are less interested in their numbers than in their usefulness to the national economy, and consequently in shortening the path to general utilization.

Such a path--the shortest possible one--between patenting and application, should have been followed by Patent No 75312 "Installation for High Voltage Rectification with Liquid-Cooled Semiconductors" (whose author is Adriana Valeria Armencoiu, ICEMENERG). The patent was granted in 1980 following the construction of a prototype as part of a research project carried out in 1977-1978. After fabricating several samples (1979-1980), the installation was adopted as a short production item. It is currently being manufactured as an independent product under the nomenclature of high voltage rectifier RIT, and can replace the kenotron (imported) for instance, in electric cable testing kits; and since all IRE's (Regional Electricity Enterprise) are equipped with this kit, the product is sufficiently important to warrant mass production.

For those who have to replace the kenotron light, who are interested in direct current, high voltage transmission, who perform high voltage testing of power equipment, and in general, who use test rectifiers at high voltages and high currents, here are a few details about this patent.

The introduction of silicon diodes in the construction of high voltage, high current rectifiers has made it possible to improve the latter. The high voltage (up to 10 kV) domain has tradionally used hot cathode tubes, thyratrons, mercury vapor rectifiers, and selenium rectifiers. Hot cathode tubes and selenium rectifiers can be connected in series up to 700 kV, but have the disadvantage of operating at very low currents of the order of a few milliamperes. The value of allowable current can increase up to one ampere through the use of series-connected silicon diodes. But these diodes are known to be sensitive to over-voltage and excessive current; rectifier circuits must therefore be selected with particular attention. To protect silicon rectifiers, one must attach a resistance that will limit the short-circuit current to a given value. Similarly, the chain of diodes must be capacitively controlled with condensers in order to obtain a linear distribution of the blocking voltage.

The rectifier built by ICEMENERG (Institute for Electric Power Research and Modernization) is of modular construction; it consists of a series circuit--chain of rectifiers in parallel with resistances and capacitors (RC)--which rectifies single phase, alternating (50 Hz) high voltages into direct current high voltages. It uses 12 series-connected rectifiers in parallel with resistances and capacitors. In a first model, 34 printed circuit cards connected in series, are mounted on an insulating tube which is in turn immersed into transformer oil, an excellent cooling agent with insulating properties. This assembly is placed in a protective can that is sealed at the ends which form the polarized terminals of the unit. After verifying the protection distances necessary for high voltage measurements, the rectifier is attached horizontally to the installation in which it is to be used. The positive terminal of the rectifier is connected to the high voltage source, and the other terminal is attached to the circuit load that requires direct current high voltage.

Some of the advantages of the device built at ICEMENERG are: a high power rectifier is formed by grouping diodes in series; volume and weight are reduced; normal operation at ambient temperatures of -50 to +50 degrees C; minimal maintenance; practically unlimited durations of operation; no special foundations or special work protection measures are needed; high reliability assured by silicon diodes and transformer oil as coolant; all components are of domestic origin; and the unit can be built by any institute specializing in electricity.

Once more, we point out the fields in which the high voltage rectifier can be used: as independent product in direct current installations, as component in installations as well as fixed and mobile laboratories for preventive testing of electric power equipment (eliminating the importation of some rectifiers), and as we mentioned, as substitute for the kenotron light.

The construction of these units--only five in number--has resulted in annual savings of more than one million lei, while importation was reduced by about 700,000 lei in currency.

Those who wish to order this unit should contact ICEMENERG, specifying as stated in the product description: high voltage rectifier, RIT type, 60 kVDC or 120 kVDC rectified voltage.

We hope that the number of users will be very high so that we may have a true general application; this will mean nothing else than the introduction of technical progress at minimum cost, and through domestic design. We not only wish to see a larger number of users, but also faster decisions. Because in the meantime... time is being wasted! The time that passes is our loss and is paid by us! Here is an excellent idea that was ready in 1978 whose leverage is exerted only in 1983! A five-year plan has passed until its general application! Under these conditions can we still say that we are impatient with the rate at which inventions are becoming outdated?

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B1  - CONTROL NUMBER:     U243074
B4  - ACCESSION NUMBER:   ........................JPRS-83912
B3  - COLLECTION CODE:    3
B6  - MANAGEMENT CODE:    XR
B7  - PROCESS ACTNG CD:   01        B7A-REGISTRATION FEE: 00000
B8  - PRODUCT MANAGER:    H
B9  - RECEIPT TYPE:       1         B9A-LOAN DUE OUT:
B10- TRANSACTION:         TN        B10A-DUPE/PRIOR/SUPER:
B12- RETURNS:             0         B12A-RETURN DATE:
B13- PROCESSING:          1
B14- PAT. POTENTIAL:      0
B17- FORM/PRICE:          12002 ,
B18- ANNOUNCE:            0000
B19- PUBLICATION-1:       u8326     B20- PUBLICATION-2:
B21- LIMITATION:          0
B23- PC BIN:              000
B24- STOCK:               0004      B24A-STOCK TYPE CODES: D
B25- PAGES/SHEETS:        00059
B26- PC PRICE CODE:       A04
B27- DOMESTIC PRICE:      0000000 B28- FOREIGN PRICE: 0000000
B29- ACTION CODES:        SS
B33- MN PRICE CODE:       X00
B34- DOMESTIC PRICE:      0000000 B35- FOREIGN PRICE: 0000000
B36- ACTION CODES:        XM
B37- RELEASABILITY CD:    A
B38- MF PRINT:            D
B39- ADDITIONAL INFO:     n
B40- PRINT PC:            n
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B42- SOURCE ORDER:        n
B42A-GENERATE RDP:        0
B42B-SUPPLIER SRC CD:     n
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